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DEPARTMENT OF THE NAVY
PUGET SOUND NAVAL SHIPYARD
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IN REPLY REFER TO:

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Mr. Michael F. Gearheard
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue, WO-135
Seattle, WA 98101

Re: Cooling Water

Dear Mr. Gearheard:

This letter is to inform you of a change to our processes affecting single-pass cooling water used by homeported vessels and vessels undergoing maintenance at Puget Sound Naval Shipyard and Intermediate Maintenance Facility (PSNS & IMF). Navy vessels use seawater cooling either from the facility's saltwater fire main or pumped directly from the bay. This water is discharged from the vessels either directly to the bay or, if the vessel is in a dry-dock, to the facility's dry-dock drainage system. The Navy has recently determined that biofouling (sea growth) of vessel cooling systems during non-operating periods impairs their operational readiness by reducing the efficiency of the vessels' heat exchangers. In the past, the Navy has used mechanical and chemical cleaning processes to remove the fouling. These cleaning processes are expensive, involve environmental risks, and can damage the heat exchangers.

In recent years the Navy has found that adding free chlorine to the seawater cooling systems prevents the formation of the fouling. Several classes of Navy vessels have chlorine injection systems as standard equipment. Recently the Navy has asked PSNS & IMF to provide temporary chlorine injection equipment for use by vessels not equipped with installed systems or while the installed equipment is not operational. These systems would be used intermittently as described in Enclosure (1) while the vessels are being overhauled or in a homeport status.

The use of chlorine injection units to prevent the formation of biofouling is more effective and safer than the alternative of frequent cleaning using toxic products such as "Safe-d-Scale". Once the fouling organisms have attached themselves to the piping surfaces, cleaning requires a fairly toxic "shock" to kill and remove the sea growth. Chemical cleaning is also less effective because removing all sea growth is impossible and what remains leaves a substrate for future organisms to attach.

The temporary chlorination units will be located either on the vessel or on the pier adjacent to the vessel. The units will intermittently add hypochlorite to the intake cooling water creating a chlorine concentration in the heat exchangers and piping sufficient to prevent marine organisms from attaching to the piping surfaces. The temporary chlorine injection systems include an auxiliary dechlorination unit that will reduce the levels of reactive chlorine to below detectable levels when discharged to the bay or dry-dock drainage system.

A description of the chlorinator/dechlorinator systems and, their use, is described in enclosure (1). The temporary biofouling prevention systems use chlorine and chlorine compounds to prevent marine organisms from attaching to the piping systems, however the concentrations of chlorine both internal to the vessel and discharged to the bay do not pose a risk to the environment. The concentrations of chlorine internal to the vessel are less than the recommended levels for drinking water systems. These temporary seawater biofouling prevention systems are equivalent to biofouling prevention systems in use on Navy and commercial vessels.

There are three situations in which these portable systems will be utilized at PSNS & IMF:

(1) When a vessel is in dry dock,

(2) when a vessel with its own biofouling system is pierside, but the internal biofouling system is not operable due to maintenance operations, and

(3) when a vessel is pierside and does not have an internal biofouling system installed.

For the reasons stated below, PSNS & IMF does not believe that a National Pollutant Discharge Elimination (NPDES) permit is required in any of these situations when the cooling water is dechlorinated prior to discharge.

Many vessels already have built in chlorinators or other biofouling prevention systems. The only potential difference to the quality of the water being discharged from vessels at PSNS & IMF using the temporary equipment is that PSNS & IMF vessels using the temporary equipment will dechlorinate the water prior to discharge while most vessels do not.

The risk from these systems is insignificant. Our NPDES permit already allows the discharge of noncontact cooling water of

potable water quality to our dry-docks and stormwater systems. It also authorizes the discharge of potable water from all other outfalls. Even before dechlorination, the levels of chlorine in the piping systems will not exceed the levels found in potable water. As a result, we believe our permit already covers this discharge.

In summary, these systems do not pose a risk to the environment and do not require a modification of our current NPDES permit. Even without the use of the dechlorinator, the concentrations and quantity of chlorine is insignificant and the systems are equivalent to systems on operating vessels. Finally, the systems will be operated in accordance with written procedures requiring dechlorination.

Questions or comments regarding this information may be addressed to Mr. Bruce Beckwith, Code 106.32, at telephone number (360) 476-0118.

Sincerely,

L. A. Cole

L. A. COLE
Director, Environment, Safety, and Health Office

Encl: (1) Submarine Chlorinator/Dechlorinator System

SUBMARINE CHLORINATOR/DECHLORINATOR SYSTEM

Enclosure (1)

SUBMARINE CHLORINATOR/DECHLORINATOR SYSTEM

Synopsis: Vessel salt-water cooling systems are subject to biological fouling by marine organisms, resulting in the need to clean the cooling systems by chemical or mechanical means. This is disruptive to operations and costly. Packaged chlorination - dechlorination systems are available to control fouling by treating the inlet cooling water with chlorine compounds. The outlet water is treated to reduce the outlet water chlorine levels to acceptable limits.

Background: Biological fouling of vessel cooling water systems is a continuing problem for vessels when in port and anchored in near-shore waters. Extended berthing of vessels pierside, especially if operational constraints preclude operation of cooling systems at high flow rates aggravates the problem. Chlorine has been determined to be an effective toxicant against the attachment and growth of both soft bodied and hard shelled marine organisms in seawater systems.

Proposed system: The proposed system consists of an electrolytic chlorine generator that electrolytically produces sodium hypochlorite (NaOCl) from seawater. The hypochlorite solution is dynamically injected into the vessel's seawater inlet sea chest for mixing into the inlet cooling water. While passing through the vessel's system, hypochlorite is consumed by exposure to the vessel system and any residual marine organisms. The cooling water is post-treated with dilute sodium bisulfite ($NaHSO_3$) to reduce any remaining oxidant in the cooling water at the vessel's outlet sea chest to 0 ppm. Post-treatment chemical is injected into vessel's piping upstream of the outlet sea chest to assure satisfactory mixing.

The proposed system treats the range of 800 to 2300 gpm cooling water to a treatment level of 0.2 to 0.4 ppm TRO (Total Residual Oxidant). This level is similar to the residual chlorine levels found in municipal drinking water systems. The post-treatment reduces system effluent level to 0 ppm TRO to minimize any impact on sea life in the surrounding waters. The chlorination - dechlorination system is operated for approximately two hours daily.

The proposed system is supported with existing training procedures and operating procedures as well as operational experience in other Navy activities. This experience with the proposed system has shown that stable treatment and post-treatment results can be reliably achieved.